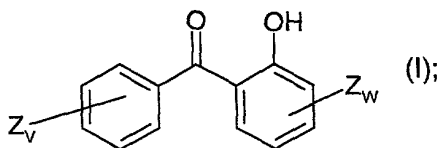
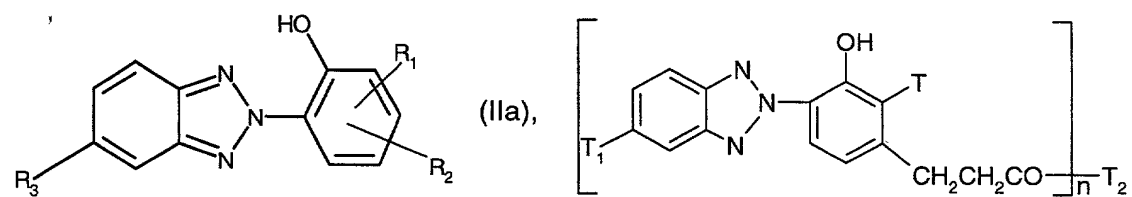


Claims

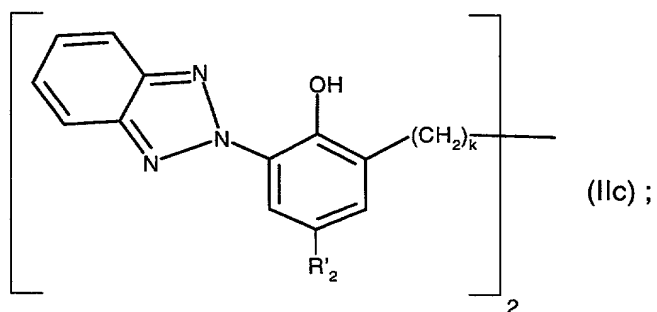
1. A polyolefin composition which comprises as UV absorber a mixture of
 - a) at least one hydroxybenzophenone and at least one 2-hydroxyphenylbenzotriazole with the proviso that the polyolefin is a high density polyethylene of the "Phillips" type or a polyethylene of the metallocene type;
 - b) at least one hydroxybenzophenone and at least one 2-hydroxyphenyltriazine, with the proviso that if the polyolefin is polypropylene, no polyvinylpyridin is present
 - c) at least one hydroxybenzophenone and at least one oxanilide;
 - d) at least one 2-hydroxyphenylbenzotriazole and at least one oxanilide;
 - e) at least one 2-hydroxyphenyltriazine and at least one oxanilide;
 - f) at least one hydroxybenzophenone, at least one 2-hydroxyphenylbenzotriazole and at least one oxanilide;
 - g) at least one hydroxybenzophenone, at least one oxanilide and at least one 2-hydroxyphenyltriazine; or
 - h) at least one 2-hydroxyphenylbenzotriazole, at least one oxanilide and at least one 2-hydroxyphenyltriazine.
2. A polyolefin composition according to claim 1 wherein the polyolefin is polyethylene or polypropylene.
3. A polyolefin composition according to claim 1 wherein the hydroxybenzophenone is of formula I



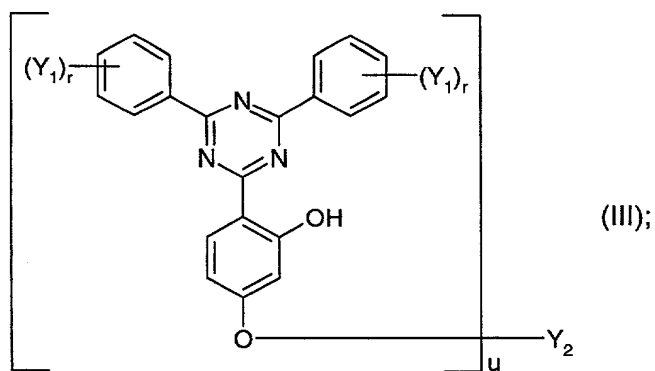
the 2-hydroxyphenylbenzotriazole is of formula IIa, IIb or IIc



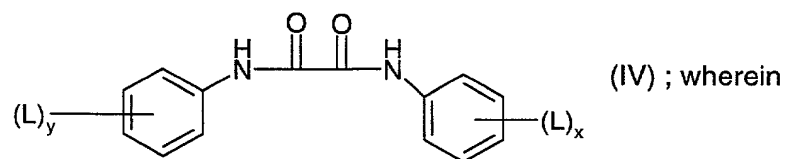
(IIb)



the 2-hydroxyphenyltriazine is of formula III



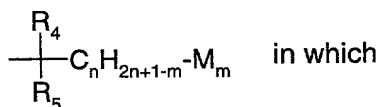
and the oxanilide is of formula (IV)



in the compounds of the formula (I) v is an integer from 1 to 3 and w is 1 or 2 and the substituents Z independently of one another are hydrogen, halogen, hydroxyl or alkoxy having 1 to 12 carbon atoms;

in the compounds of the formula (IIa),

R₁ is hydrogen, alkyl having 1 to 24 carbon atoms, phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety, cycloalkyl having 5 to 8 carbon atoms or a radical of the formula



R₄ and R₅ independently of one another are alkyl having in each case 1 to 5 carbon atoms, or R₄, together with the radical C_nH_{2n+1-m}, forms a cycloalkyl radical having 5 to 12 carbon atoms,

m is 1 or 2, n is an integer from 2 to 20 and

M is a radical of the formula -COOR₆ in which

R₆ is hydrogen, alkyl having 1 to 12 carbon atoms, alkoxyalkyl having in each case 1 to 20 carbon atoms in the alkyl moiety and in the alkoxy moiety or phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety,

R₂ is hydrogen, halogen, alkyl having 1 to 18 carbon atoms, and phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety, and

R₃ is hydrogen, chlorine, alkyl or alkoxy having in each case 1 to 4 carbon atoms or -COOR₆ in which R₆ is as defined above, at least one of the radicals R₁ and R₂ being other than hydrogen;

in the compounds of the formula (IIb)

T is hydrogen or alkyl having 1 to 6 carbon atoms,

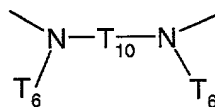
T₁ is hydrogen, chlorine or alkyl or alkoxy having in each case 1 to 4 carbon atoms,

n is 1 or 2 and,

if n is 1,

T₂ is chlorine or a radical of the formula -OT₃ or $\begin{array}{c} \text{T}_4 \\ | \\ -\text{N} \\ | \\ \text{T}_5 \end{array}$ and,

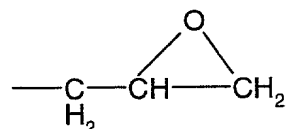
if n is 2, T₂ is a radical of the formula



or -O-T₉-O- in which

T₃ is hydrogen, alkyl which has 1 to 18 carbon atoms and is unsubstituted or substituted by 1 to 3 hydroxyl groups or by -OCOT₆, alkyl which has 3 to 18 carbon atoms, is interrupted once or several times by -O- or -NT₆- and is unsubstituted or substituted by hydroxyl or -OCOT₆, cycloalkyl which has 5 to 12 carbon atoms and is unsubstituted or substituted by hydroxyl and/or alkyl having 1 to 4 carbon atoms, alkenyl which has 2 to 18 carbon atoms and is unsubstituted or substituted by hydroxyl, phenylalkyl having 1 to 4 carbon atoms in the

alkyl moiety, or a radical of the formula -CH₂CH(OH)-T₇ or



T₄ and T₅ independently of one another are hydrogen, alkyl having 1 to 18 carbon atoms, alkyl which has 3 to 18 carbon atoms and is interrupted once or several times by -O- or -NT₆-, cycloalkyl having 5 to 12 carbon atoms, phenyl, phenyl which is substituted by alkyl having 1 to 4 carbon atoms, alkenyl having 3 to 8 carbon atoms, phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety or hydroxyalkyl having 2 to 4 carbon atoms,

T₆ is hydrogen, alkyl having 1 to 18 carbon atoms, cycloalkyl having 5 to 12 carbon atoms, alkenyl having 3 to 8 carbon atoms, phenyl, phenyl which is substituted by alkyl having 1 to 4 carbon atoms, phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety,

T₇ is hydrogen, alkyl having 1 to 18 carbon atoms, phenyl which is unsubstituted or substituted by hydroxyl, phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety, or -CH₂OT₈,

T₈ is alkyl having 1 to 18 carbon atoms, alkenyl having 3 to 8 carbon atoms, cycloalkyl having 5 to 10 carbon atoms, phenyl, phenyl which is substituted by alkyl having 1 to 4 carbon atoms, or phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety,

T₉ is alkylene having 2 to 8 carbon atoms, alkenylene having 4 to 8 carbon atoms, alkynylene having 4 carbon atoms, cyclohexylene, alkylene which has 2 to 8 carbon atoms and is interrupted once or several times by -O-, or a radical of the formula -CH₂CH(OH)CH₂OT₁₁OCH₂CH(OH)CH₂- or -CH₂-C(CH₂OH)₂-CH₂-,

T₁₀ is alkylene which has 2 to 20 carbon atoms and can be interrupted once or several times by -O-, or cyclohexylene,

T₁₁ is alkylene having 2 to 8 carbon atoms, alkylene which has 2 to 18 carbon atoms and is

interrupted once or several times by -O-, 1,3-cyclohexylene, 1,4-cyclohexylene, 1,3-phenylene or 1,4-phenylene, or

T₁₀ and T₆, together with the two nitrogen atoms, are a piperazine ring;

in the compounds of formula (IIc)

R'₂ is C₁-C₁₂alkyl and k is a number from 1 to 4;

in the compounds of the formula (III)

u is 1 or 2 and r is an integer from 1 to 3, the substituents

Y₁ independently of one another are hydrogen, hydroxyl, halogenomethyl, alkyl having 1 to 12 carbon atoms, alkoxy having 1 to 18 carbon atoms, or halogen,

if u is 1,

Y₂ is alkyl having 1 to 18 carbon atoms, phenoxy which is unsubstituted or substituted by hydroxyl, alkoxy having 1 to 18 carbon atoms, or halogen, or is substituted by alkyl or alkoxy having in each case 1 to 18 carbon atoms or halogen, alkyl which has 1 to 12 carbon atoms and is substituted by -COOH, -COOY₈, -CONH₂, -CONHY₉, -CONY₉Y₁₀, -NH₂, -NHY₉, -NY₉Y₁₀, -NHCOY₁₁, -CN and/or -OCOY₁₁, alkyl which has 4 to 20 carbon atoms, is interrupted by one or more oxygen atoms and is unsubstituted or substituted by hydroxyl or alkoxy having 1 to 12 carbon atoms, alkenyl having 3 to 6 carbon atoms, glycidyl, cyclohexyl which is unsubstituted or substituted by hydroxyl, alkyl having 1 to 4 carbon atoms and/or -OCOY₁₁, phenylalkyl which has 1 to 5 carbon atoms in the alkyl moiety and is unsubstituted or substituted by hydroxyl, chlorine and/or methyl, -COY₁₂ or -SO₂Y₁₃, or,

if u is 2,

Y₂ is alkylene having 2 to 16 carbon atoms, alkenylene having 4 to 12 carbon atoms, xylylene, alkylene which has 3 to 20 carbon atoms, is interrupted by one or more -O- atoms and/or is substituted by hydroxyl, -CH₂CH(OH)CH₂-O-Y₁₅-OCH₂CH(OH)CH₂, -CO-Y₁₆-CO-, -CO-NH-Y₁₇-NH-CO- or -(CH₂)_m-CO₂-Y₁₈-OCO-(CH₂)_m, in which

m is 1, 2 or 3,

Y₈ is alkyl having 1 to 18 carbon atoms, alkenyl having 3 to 18 carbon atoms, alkyl which has 3 to 20 carbon atoms, is interrupted by one or more oxygen or sulfur atoms or -NT₆- and/or is substituted by hydroxyl, alkyl which has 1 to 4 carbon atoms and is substituted by -P(O)(OY₁₄)₂, -NY₉Y₁₀ or -OCOY₁₁ and/or hydroxyl, alkenyl having 3 to 18 carbon atoms, glycidyl, or phenylalkyl having 1 to 5 carbon atoms in the alkyl moiety,

Y₉ and Y₁₀ independently of one another are alkyl having 1 to 12 carbon atoms, alkoxyalkyl

having 3 to 12 carbon atoms, dialkylaminoalkyl having 4 to 16 carbon atoms or cyclohexyl having 5 to 12 carbon atoms, or Y_9 and Y_{10} together are alkylene, oxaalkylene or azaalkylene having in each case 3 to 9 carbon atoms,

Y_{11} is alkyl having 1 to 18 carbon atoms, alkenyl having 2 to 18 carbon atoms or phenyl,

Y_{12} is alkyl having 1 to 18 carbon atoms, alkenyl having 2 to 18 carbon atoms, phenyl, alkoxy having 1 to 12 carbon atoms, phenoxy, alkylamino having 1 to 12 carbon atoms or phenylamino,

Y_{13} is alkyl having 1 to 18 carbon atoms, phenyl or alkylphenyl having 1 to 8 carbon atoms in the alkyl radical,

Y_{14} is alkyl having 1 to 12 carbon atoms or phenyl,

Y_{15} is alkylene having 2 to 10 carbon atoms, phenylene or a group -phenylene-M-phenylene- in which M is -O-, -S-, -SO₂-, -CH₂- or -C(CH₃)₂-,

Y_{16} is alkylene, oxaalkylene or thiaalkylene having in each case 2 to 10 carbon atoms, phenylene or alkenylene having 2 to 6 carbon atoms,

Y_{17} is alkylene having 2 to 10 carbon atoms, phenylene or alkylphenylene having 1 to 11 carbon atoms in the alkyl moiety, and

Y_{18} is alkylene having 2 to 10 carbon atoms or alkylene which has 4 to 20 carbon atoms and is interrupted once or several times by oxygen;

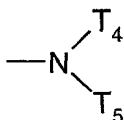
in the compounds of the formula (IV) x is an integer from 1 to 3 and the substituents L independently of one another are hydrogen, alkyl, alkoxy or alkylthio having in each case 1 to 22 carbon atoms, phenoxy or phenylthio.

4. A polyolefin composition according to claim 3, in which, in the compounds of the formula (IIa), R_1 is hydrogen or alkyl having 1 to 20 carbon atoms, R_2 is hydrogen, alkyl having 1 to 18 carbon atoms or phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety and R_3 is hydrogen, chlorine or alkyl having 1 to 4 carbon atoms.

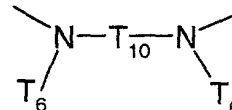
5. A polyolefin composition according to claim 4, in which R_1 is in the ortho-position relative to the hydroxyl group and is hydrogen or alkyl having 4 to 12 carbon atoms, R_2 is in the para-position relative to the hydroxyl group and is alkyl having 1 to 6 carbon atoms or cumyl and R_3 is hydrogen or chlorine.

6. A polyolefin composition according to claim 3, in which, in the compounds of the formula

(IIb), T is alkyl having 1 to 6 carbon atoms, T₁ is hydrogen, chlorine or alkyl having 1 to 4 carbon atoms, n is 1 or 2 and, if n is 1, T₂ is one of the radicals of the formula -OT₃ or



and, if n is 2, T₂ is a radical of the formula -O-T₉-O- or



in which T₃ is hydrogen, alkyl having 1 to 18 carbon atoms or alkyl which has 3 to 18 carbon atoms and is interrupted once or several times by -O-, T₄ and T₅ independently of one another are hydrogen, alkyl having 1 to 18 carbon atoms, alkenyl having 3 to 8 carbon atoms or hydroxyalkyl having 2 to 4 carbon atoms, T₆ is hydrogen or alkyl having 1 to 6 carbon atoms, and T₉ and T₁₀ are alkylene having 2 to 8 carbon atoms, alkenylene having 4 to 8 carbon atoms or alkylene which has 2 to 18 carbon atoms and is interrupted once or several times by -O-.

7. A polyolefin composition according to claim 3, in which, in the compounds of the formula (III), the substituents Y₁ are hydrogen, alkyl having 1 to 12 carbon atoms or halogen, if u is 1, Y₂ is alkyl having 1 to 18 carbon atoms, alkyl which has 1 to 12 carbon atoms and is substituted by hydroxyl, alkoxy having 1 to 18 carbon atoms, -COOY₈, -CONY₉Y₁₀ and/or -OCOY₁₁, glycidyl or phenylalkyl having 1 to 4 carbon atoms in the alkyl moiety, or, if u is 2, Y₂ is alkylene having 2 to 16 carbon atoms, alkenylene having 4 to 12 carbon atoms, xylene or alkylene which has 3 to 20 carbon atoms, is interrupted by one or more -O- atoms and/or is substituted by hydroxyl, the substituents Y₈ to Y₁₁ being as defined in claim 3.

8. A polyolefin composition according to claim 7, in which u is 1 and r is 2, Y₁ is alkyl having 1 to 4 carbon atoms and Y₂ is alkyl having 1 to 18 carbon atoms or alkyl which has 1 to 12 carbon atoms and is substituted by hydroxyl, alkoxy having 1 to 18 carbon atoms, -COOY₈ and/or -OCOY₁₁, Y₈ being alkyl having 1 to 18 carbon atoms, alkenyl having 3 to 18 carbon atoms or alkyl which has 3 to 20 carbon atoms, is interrupted by one or more oxygen atoms and/or is substituted by hydroxyl, and Y₁₁ being alkenyl having 2 to 18 carbon atoms.

9. A polyolefin composition according to claim 8, in which Y₁ is methyl and Y₂ is an octyl radical or alkyl which has 1 to 3 carbon atoms and is substituted by hydroxyl, alkoxy having 13 or 15 carbon atoms, -COOY₈ and/or -OCOY₁₁, Y₈ being a decyl or octadecenyl radical or alkyl which has 7 carbon atoms and is substituted by hydroxyl and interrupted by an oxygen atom, and Y₁₁ being propenyl.

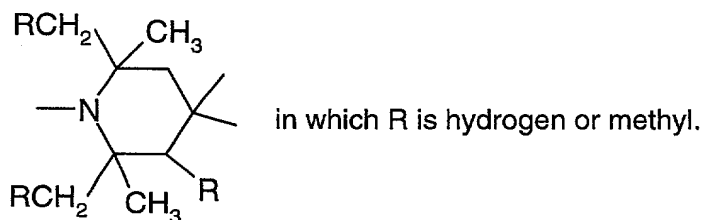
10. A polyolefin composition according to claim 3, in which, in the compounds of the formula (I), v and w independently of one another are 1 or 2 and the substituents Z independently of one another are hydrogen, halogen or alkoxy having 1 to 12 carbon atoms.

11. A polyolefin composition according to claim 3, in which, in the compounds of the formula (IV), x and y are 1 or 2 and the substituents L independently of one another are hydrogen or alkyl having in each case 1 to 12 carbon atoms.

12. A polyolefin composition according to claim 1 wherein the amount of the individual UV absorber in the mixture is from 20% to 80% based on the weight of the mixture, with the proviso that the sum adds to 100%.

13. A polyolefin composition according to claim 1 wherein the total amount of UV-absorber is from 0.005 to 5% based on the weight of the polymer.

14. A polyolefin composition according to claim 1, which additionally contains at least one sterically hindered amine, in particular an amine of this type containing at least one radical of the formula



15. The use of a mixture of UV-absorbers according to claim 1 for the stabilization of polyolefins.